

# A View of the Medical and Nutritional Consequences of the Earthquake in Guatemala

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IN THE PREDAWN HOURS of February 4, 1976, seismic movement along Guatemala's Motagua Fault resulted in a powerful, devastating shock wave which spread along the surface from the eastern region to the highlands. The initial quake at 3:04 am lasted 39 seconds and registered 7.5 on the Richter Scale at its epicenter. When it had passed, 22,000 people lay dead or dying, 74,000 had been seriously injured, and more than a million were homeless. With the earthquakes in Guatemala, Turkey, Italy, China, and the South Pacific, 1976 has been estimated to be the worst year in recorded history for earthquake-related deaths.

Earthquakes represent a major threat to human health and safety on a worldwide scale, and a systematic evaluation of the resulting health problems

would be an essential contribution toward preventing death and suffering in future quakes. Indeed, several scholarly analyses of some public health consequences of the Guatemalan earthquake have appeared (1, 2). Dispassionate observation and analysis in the face of such a catastrophic disaster, however, especially for those intimately involved with the event are difficult, if not inappropriate.

We offer the observations and personal views of a physician and a nutritionist on some medical and nutritional issues associated with the Guatemalan earthquake. We experienced the quake as startled civilians and participated in the relief efforts as health professionals.

## The Land and the People

Guatemala is the northernmost republic in the Central American chain, bordered on the north by Mexico and on the south by Honduras and El Salvador. The land shows the effects of geological activity. A chain of volcanos, some active, stretches through the highlands or *altiplano* into the eastern region or *Oriente*. The impressive Lakes Atitlán and Amatitlán were formed by the rise of volcanic mounds on the Pacific side of the highlands. Landslides from major earthquakes in 1773 and 1917-18 denuded areas on the mountainsides which remain barren today.

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According to the 1970 census, Guatemala had slightly more than 5,400,000 inhabitants (3). A majority of the population are indigenous descendants of the Mayans; the remainder, of Spanish or mixed Spanish-Indian ancestry, are collectively called "ladinos." Infantile diarrheal disease and childhood protein-calorie malnutrition are prevalent in Guatemala (4). The excessive mortality and morbidity from common childhood diseases, such as measles, recorded for this country led Scrimshaw and co-workers (5) to postulate a synergistic interaction between nutritional status and infectious disease. The basic diet consists of corn (maize) and black beans. The consumption of protein is generally adequate, but the intake of calories is often deficient. Deficiencies of iron and vitamin A are also prevalent (6). Thus, under normal conditions as well as in disaster,

the health indices of the country are markedly influenced by the nutritional status of the population.

### **Immediate Consequences of the Earthquake**

With the passing of the initial shock wave in Guatemala City, electric services and the water supply were immediately disrupted. The loss of electricity meant that refrigeration of foods and medical supplies was impossible, and electric stoves were useless. In the poorer sections of the capital, houses built of adobe (mud brick) crumbled. The destruction of shelter was especially lethal in the areas where squatters had built their houses on the sides of the steep ravines or *barrancas* which surround the city.

Two general hospitals serve the indigent urban populations, the San Juan de Dios Hospital, downtown, and the Roosevelt Hospital on the southwest

*Only remaining wall of a house in San Juan Sacatepéquez. Adobe structures in Guatemala were particularly vulnerable to the earthquake's force.*



side. A surgical resident, Dr. Roberto Seidner, gave a firsthand account of the chaos which reigned at the Roosevelt Hospital in the minutes and hours following the quake:

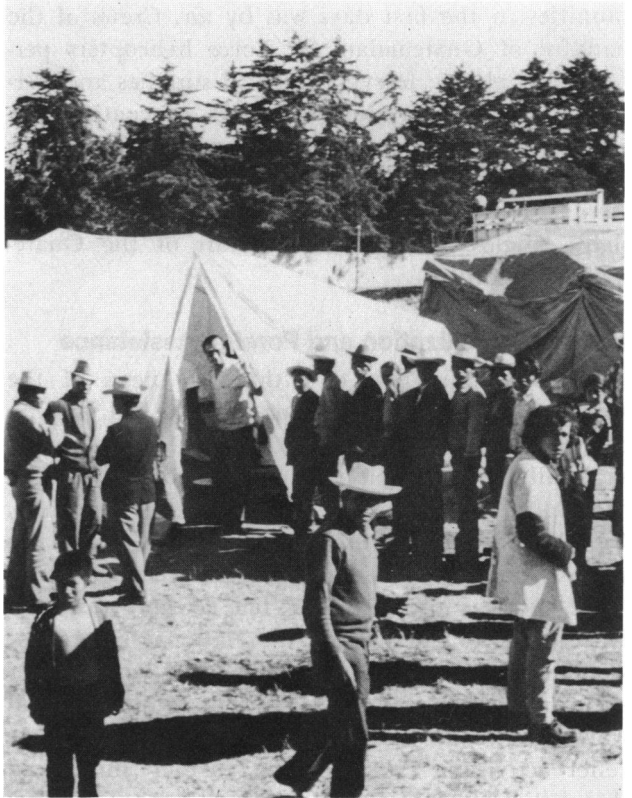
A massive traffic jam developed within minutes. Vehicles could neither approach nor leave the hospital area. There was no water and no auxiliary power generator. In order to examine the patients on arrival, we used the focused beams of automobile headlights. 800 patients arrived in the 3 hours before daylight. The severely injured were triaged into the dark hospital corridors, the less severely injured were assigned to places on the lawn, and the dead were also placed on the lawn 25 meters away from the living. Surgical activities could not begin until daylight, and then only by the illumination of windows and skylights. Teams of surgeons and residents operated for 56 hours straight in some cases. My partner and I performed 32 operations during this time. When surgical gloves ran short, they were washed in disinfectant solutions between procedures. The numerous aftershock tremors in the days following the initial quake provoked a state of fear and tension in the operating suites.

In the maternity service of the Roosevelt complex, a cesarean section was in progress as the earthquake struck. The infant and placenta were being delivered as the seismic activity began. After the blackout, the uterine repair and skin closure had to be accomplished by the dim light of head lamps. A strong tremor on February 6 at midday caused such extensive additional damage to the physical plant of the San Juan de Dios Hospital that the patients and staff had to be evacuated. A temporary facility was established in the pavilions of the Industrial Exposition Park.

Because a greater percentage of structures in the population centers of the Guatemalan countryside were built of adobe, the destruction there was proportionately worse than in the capital. The litany of *altiplano* and *Oriente* communities with greater than 80 percent of the buildings destroyed was enormous: Chimaltenango, Tecpán, Patzicía, Patzún, Sumpango, Santa María Cauqué, San Pedro Sacatepéquez, San Juan Sacatepéquez, Zaragoza, Comalapa, San Martín Jilotepeque, Sanarate, El Progreso, and others. In Chimaltenango Province alone, more than 10,000 people died, and among the buildings destroyed were the rural health centers and hospitals. Of the three health centers in Chimaltenango City, only the Behrhorst Clinic, founded and run by the American physician, Carroll Behrhorst, was able to operate on the morning of the disaster. Behrhorst reported that his facilities were inundated with injured and that the supplies of analgesics and antibiotics were exhausted within hours. Moreover, a scarcity of pure water created serious problems throughout the rural areas in the aftermath of the quake.

*Patients line up at hospital tent in San Juan Sacatepéquez. More than 200 persons arrived each day at the hospital encampment.*

*Nutritionist Nancy Butte (center) supervises the distribution of dry foods at a hamlet. The earthquake buried food supplies and landslides destroyed roads, isolating towns in the countryside.*



To complicate the situation further, huge landslides or *derrumbes* in the mountain passes along main and secondary highways had all but isolated the countryside from the capital. The Aguacaliente Bridge, a major span on the highway to the Caribbean coast, had crumbled, cutting off the entire *Oriente*. The only access to many stricken communities in the first days was by air. Crews of the handful of Guatemalan Air Force helicopters performed tirelessly, ferrying medical supplies and personnel into the countryside and evacuating the severely injured to the already overcrowded hospitals of the capital. Straight stretches of paved highway were converted into makeshift landing strips for light, single-engine private aircraft of the Guatemalan Air Club.

### **National Mobilization and Foreign Assistance**

Throughout the first day, the only news of the situation throughout the country came via battery-operated radios from a station in Honduras. By nightfall, however, electric power had returned to the capital at Guatemala. At 7 pm, a tired President, General Kjell Laugerud García, made a telecast report to the nation on his helicopter reconnaissance flight over the affected areas. The account was grim. In response to the disaster, the National Emergency Committee, an ad hoc body originally designed for such limited emergencies as volcanic eruptions, tidal waves, or floods, had been activated to coordinate relief activities. The President further announced that relief units from Mexico and other Central American republics had already arrived on Guatemalan soil and that scores of other countries had promised assistance. His address was charged with optimism and courage to convince the populace that it was neither alone nor helpless. *Estámos heridos, pero no de muerte* (We are injured, but not fatally wounded) said the General. *Guatemala está en pie!* (Guatemala is on her feet!)

In all, 35 nations including such remote countries as Taiwan, Korea, and Pakistan (7), and more than a dozen international organizations contributed material aid to the post-earthquake relief effort. Because of a major territorial dispute with Great Britain over Belize (formerly British Honduras), a British colony bordering Guatemala, official aid from Britain was declined. Moreover, it was widely rumored that a squadron of Cuban planes was refused landing rights. Nonetheless, the air was filled with cargo aircraft of various flags. On several days, the number of landing and takeoff operations at Aurora International Airport exceeded 1,200. An

entire U.S. Army field hospital—personnel, supplies, equipment, and vehicles including helicopters—arrived by air from Fort Sill, Okla. They joined Behrhorst and a Costa Rican Red Cross unit in providing care in the devastated Chimaltenango Province.

Guatemala was able to mobilize its existing resources. Red Cross units from unaffected areas rolled into the *altiplano* and *Oriente*. Young physicians and medical students from San Carlos University volunteered their services. The huge food storage warehouses of CARE and INDECA (the Guatemalan Institute of Agricultural Productivity) were tapped for foods to distribute throughout the stricken countryside. Radio stations and newspaper articles carried educational messages on water and food safety precautions and basic sanitation and health measures.

### **Hospital Encampment at San Juan Sacatepéquez**

Beginning on the second day after the quake, we participated in relief work in the region of San Juan Sacatepéquez, 27 kilometers from Guatemala City. A provisional hospital encampment had been established on the municipal soccer field with equipment and supplies from the Honduran Red Cross; the San Juan Hospital had been totally destroyed in the quake. The main focus of activity was the hospital tent, a shelter of perhaps 8 by 5 meters. All of the medical care for the community and its outlying hamlets was being provided in the tent, which was equipped with one surgical table and lacked even partitions for privacy. When we arrived, the majority of patients were being examined and treated on filthy mattresses or straw mats placed on the ground. The few blankets served for all patients.

The hospital was staffed by a young Guatemalan surgeon, a Guatemalan pediatric resident, the physician co-author, and a changing group of medical students. Three Honduran physicians were also present, but initially they were not well integrated into the emergency services owing to poor communication between the Guatemalan health workers and their counterparts from the neighboring republic. Nurses and nurses aides from the San Juan Hospital moved to the encampment, and they were joined by a Canadian registered nurse. A gasoline-operated electric generator, provided by the Guatemalan Army Corps of Engineers who were also using the encampment as their base, permitted us to continue medical activities after dark. A cadre of cadets from the Guatemalan Military Academy was also on hand to maintain order and perform heavy tasks.



*Nurses established a pharmacy dispensary away from the crowded main hospital tent.*

The hospital tent served not only as the center for all examinations and treatment, but also as the storage area for medical supplies. These supplies were arrayed in the back recesses of the shelter. Supplies had come from a Mexican donation; the Honduran Red Cross had provided bandages and medicines; some supplies had been salvaged from the rubble of the main hospital; and we had loaded the Jeep with supplies available in the city and with drums of clean water. Usually, only a few gallons of pure water were available, and the boiling of water for medical use was difficult. Among the potpourri of medical supplies, gauze bandages and plaster rolls were in sufficient supply as were syringes, needles, cotton, suture material, and aspirins. We had large quantities of anti-tetanus hyperimmune globulin, but little tetanus toxoid. Supplies of injectable antibiotics were limited, and potent analgesics were scarce. A small supply of intravenous fluids were on hand, but we lacked plastic infusion

catheters, and the fluids had to be administered through ordinary metal hypodermic needles.

Patients came to the encampment by all modes of transportation; some were brought on makeshift stretchers, others strapped to chairs. The Honduran Red Cross had sent ambulances, but the drivers were unfamiliar with the terrain. Moreover, roads to the neighboring hamlets were often impassable in the first days. As the roads were progressively opened, the flow of patients remained constant throughout our first 5 days at San Juan; the arrivals averaged slightly more than 200 per day.

But with each successive day, the injuries sustained in the initial quake were more difficult to treat. About half of the patients had traumatic injuries directly attributable to the earthquake. Head injuries, anterior dislocations of the hips, fractured clavicles, and long bone fractures were common. A large number of the fractures of the extremities were exposed. There were innumerable lacerations and open wounds; many of them were suppurating when the patients reached San Juan. We attempted to evacuate to Guatemala City patients with severe head injuries presenting neurological signs and those with compound fractures.

Closed fractures were reduced and casted without the benefit of X-rays, and a date for removal was scribbled onto the drying plaster cast. Rarely was a laceration recent enough or clean enough for primary suturing. Those that had been previously sutured elsewhere were often infected by the time the patient arrived at San Juan and the wound had to be opened and washed. We developed a practical, routine treatment for open wounds. A vigorous washing and irrigation with soap, disinfectant, and water was performed; the scrubbing had to be painfully brisk, but the patients were extraordinarily stoical. Anti-tetanus inoculations and a single dose of penicillin was given, and oral antibiotics dispensed. Patients with fever or those with necrotic wounds were requested to report daily for examination, debridement, and parenteral antibiotics. A mountain of soiled gauze and cotton used to clean infected wounds accumulated on the ground almost as fast as the cadets could collect the debris. Its disposal was an additional problem.

Initially, there was no system of triage, and patients were seen in turn except for those who arrived on stretchers. We could provide first-aid management for most patients. A few had emergent, catastrophic conditions: a prematurely delivered infant could not be resuscitated; a man in severe respiratory distress proved to have sustained fractured ribs and pneumo-



thorax. We transported him in our Jeep to the capital, a 45-minute trip over dark, dusty roads in a successful race against imminent suffocation.

Shortly after our arrival in the San Juan encampment, however, we noted improvements in the facilities. First, a pharmacy was established by the nurses outside the main tent, and all but emergency medications and injectable medicines were dispensed by prescription. With additional canvas, an auxiliary shelter in which minor and nonsurgical complaints could be handled was appended to the main tent. A system of triage was established to direct the more seriously injured into the tent and those with lesser complaints or those returning for followup treatments to the outdoor medical station. Within the tent, partitions were established to provide a modicum of privacy. Latrines were dug at the far end of the soccer area, as was a pit to bury the refuse from the surgical procedures. These innovations made patient care more efficient and effective at the San Juan encampment.

### Feeding the Multitude

At San Juan, the problem of food and alimentation was an issue as large and complex as the logistics of patient care. The Honduran Red Cross had established a kitchen, staffed by women from the community, to provide meals for their volunteers. The Army units had canned rations. The professionals attending the hospital tent admitted that they had not had a meal that day nor had there been any provision to feed the convalescing patients and their families. In the background was the disruption of food supplies for the people of the San Juan community. When it was learned that Butte was a nutritionist, she was asked to assist in the coordination of all aspects of food services at the encampment.

A first task was to organize food services for the patients and the Guatemalan volunteers working at the hospital. Some supplies had been obtained from the Social Services Department of Roosevelt Hospital and, on February 7, a consignment of Mexican food including beans, tamales, canned meat, juices, and so forth arrived. We also received foodstuffs from less affected areas of the country, and the owner of a Guatemala City-based soup company had brought a truck loaded with powdered soup to the San Juan encampment. These items were to provide the nucleus for a stable meal service within the encampment. The problem of separate kitchens for the Hondurans and Guatemalans was negotiated, and it was decided to establish a single canteen facility. The hope was that breaking bread together would help

to break the ice and improve communication among the health workers at the encampment. The idea proved successful, and soon Honduran and Guatemalan physicians and nurses were eating as well as working side by side.

Through the San Juan women volunteers in the kitchens, we became aware of the food situation in the community. The harvest had been brought in months earlier, but most of the food stores had been buried in the rubble of the adobe houses, along with cooking utensils. More important, potable water was scarce. Army tank trucks had delivered several tons of water into a plastic lined reservoir tank at the encampment, but the water was stagnant, uncovered, and unfit for drinking unless boiled. Moreover, the priorities of the inhabitants were first, treatment for the sick and injured in each family, next the burial of the dead, and then devising some form of shelter. The community was understandably dazed by the shock of the universal devastation and by the continuing strong aftershocks. Thus, it was decided to establish a community "soup kitchen" at the encampment and to begin the distribution of hot meals.

Fortunately, a large supply of powdered and dry commodities provided by international relief agencies had already reached the encampment. Dried milk, fortified rolled oats, soy-fortified grits, wheat flour, sugar, and cooking oil had been arriving, and a special food warehouse had been established. Some commodities were unfamiliar to the natives of San Juan, but we felt that if they were prepared in a familiar form such as *atol* (thin porridge) or *mush* (thick porridge), they would be accepted. A menu of oatmeal porridge with sugar and milk was planned. Military cadets scrubbed out nine oil drums to be used as pots. Wood, primarily the beams of fallen houses, was gathered for fires. Water was set to boil. In the meantime, a local indigenous leader, Celia Cheth, who was perfectly bilingual in the Cachiquel dialect and in Spanish, rode through the town announcing the breakfast distribution over a bull horn. The multitude began to arrive. More than a thousand men, women, and children were organized into orderly lines by the cadets. Within 45 minutes, the entire group had passed through the lines and received a ladle of oatmeal mush. For the noon meal, we used the soup donation, and the following morning, an *atol* of grits was served. Word had spread by this time, and close to 2,000 people arrived for the third hot meal distribution.

Hot meal service for so many people was becoming difficult. Moreover, stability was returning to the San Juan community. Thus, a decision was made

to distribute commodities rather than prepared foods. That afternoon, rations of oats and grits were portioned out to the several thousand citizens who arrived. Also, working from a list of the affiliated hamlets of the San Juan district, we dispatched truck loads of commodities to the outlying villages as soon as road communications had been reestablished.

Throughout rural Guatemala, the practice of breast feeding is universal; according to Mata, it is so culturally ingrained that during a 14-year longitudinal observation in one highland village, breast feeding failure was virtually unknown (4). Therefore, another important concern became the survival of infants whose mothers complained that their milk had dried up. Many women told the nutrition workers that the shock and terror (*susto*) of the quake had stopped the flow of breast milk and asked how to feed their infants. We understood that attempting to institute artificial feeding under the conditions left by the earthquake would place the infants at significant risks of infection and nutritonal deficiency. With a Cachiuel-speaking interpreter, we gave out supplies of the powdered milk available at the encampment with detailed and explicit instructions as to the boiling of water, sterility of containers, and so forth, but we were pessimistic about the long-term survival of these infants. We later learned that wet nursing, although rarely necessary except in instances of peripartum death of the mother, is a culturally acceptable practice in the highlands of Guatemala. Moreover, in other affected communities in which cessation of lactation due to *susto* was common in the first few post-earthquake days, the subsequent resumption of normal milk flow was documented by health workers.

The nutritional situation in the Guatemalan highlands in the face of the earthquake was favorable because of the recent harvest of corn and beans. This supply of food could be retrieved from the rubble. Had the earthquake occurred before the harvest or in the heart of the rainy season, both immediate and the long-term nutritional consequences might have been more severe.

### Epidemics and Infectious Disease

Most medical workers were aware of the special relationship between malnutrition and infection in Guatemala and, thus, there was substantial concern that a wave of epidemics would follow the earthquake. The lack of pure water, exposure to cold, food contamination, and acute malnutrition were postulated as potential risk factors. Diarrheal disease was the prime concern. Shigella, associated with in-

fantile diarrhea, had been frequently isolated in one representative *altiplano* village (8). Typhoid is also endemic in the Guatemalan highlands.

At the San Juan encampment, we saw a number of infants with enteritis, fever, and mild dehydration. In general, these children were examined, given oral glucose-electrolyte solutions as indicated, and released to the care of the mothers. Without a knowledge of the prevalence of diarrhea before the disaster, we could not be sure whether or not the number of cases was excessive for that season of the year. Fecal cultures were a luxury which was unavailable and, therefore, the etiology of the diarrheal episodes was never determined.

A second concern was measles because historically measles has carried increased morbidity and mortality in Guatemala (5). A national measles vaccination campaign had been conducted among preschool children in 1972. A 12-year-old girl came to the San Juan medical station on the fifth day following the quake with fever and malaise. Her 8-year-old sibling had had a similar syndrome before the earthquake. Our patient was obviously febrile and miserable. Although she did not have an exanthem, her oral mucosa showed the classic Koplik's spots of rubeola. We feared that she would be an index case of an epidemic of measles in the San Juan area, and we instructed her father to quarantine the patient and her siblings in the home. A limited outbreak of measles was later reported from the health station at neighboring San Pedro Sacatepéquez.

The possibility of a measles epidemic also arose in Tecpán, Chimaltenango Province, on the second weekend after the quake. The commandant of the regional Army Medical Corps was searching for measles vaccine for use in two remote hamlets where more than 20 children were alleged to have died of measles bronchopneumonia. He explained that during the 1972 immunization campaign, many rural families, distrustful of Western medicine, had fled from the public health vaccination teams. We had some 150 doses of measles vaccine, but it had not been consistently refrigerated and was of questionable potency. Moreover, we argued, on epidemiologic grounds, that vaccination would no longer be effective in communities where measles had already appeared. We suggested that the most effective public health measure would be to restrict movement of children in and out of the affected hamlets. The officer agreed with our epidemiologic reasoning, but said that he really needed the vaccine to achieve psychological and political ends. To convince the citizens of these hamlets to restrict their mobility



*Patients used all modes of transportation to reach the encampment. Using the traditional Guatemalan headstrap, a father carried his daughter, strapped to a chair, 8 miles for medical help.*

voluntarily, he felt it would be necessary to demonstrate some tangible efforts. Vaccination, symbolic as it admittedly was, was felt to be his best public relations gambit to elicit cooperation in a voluntary quarantine, and the vaccine was used for this purpose.

### **Western Versus Traditional Medicine**

Despite centuries of geographic coexistence, deep gulfs exist between the indigenous Mayan culture of Guatemala and the transplanted Latin culture. One manifestation is a certain distrust of modern, Western medicine. As previously noted, many rural Guatemalan Indians allegedly kept their children from participation in the anti-measles vaccination campaigns, leaving an immunologically vulnerable reservoir for potential future epidemics. Moreover, fatalism runs deep in the indigenous Guatemalan.

Many residents of Santa Maria Cauqué who had sustained fractures initially refused evacuation to the hospitals of the capital. They expressed the view

that hospitals are a place to die (an opinion encountered widely throughout the *altiplano*), and that if they were to die, it should be in their home community. After persistent coaxing by the personnel of the local health center, most of Santa Maria's severely injured finally agreed to be transported to the capital for treatment. In San Juan, we personally faced such a situation. The father of a severely injured boy, a boy with a 6-day old, angulated compound fracture, refused to allow the child to be evacuated. The medical indications were clearly for an open surgical reduction followed by intensive antibiotic treatment for presumed osteomyelitis. We reasoned, we threatened, we cajoled, we pleaded, but the father took the boy back to his hamlet where he was lost to followup.

A similar attitude toward Western medicine in disaster relief among indigenous people has been documented by Glass after the 1970 Peruvian earthquake (9). *Shaman* or *curanderos* (herbal medicine men) and *comadronas* (midwives) constitute the practitioners of traditional medicine among the Indians of the Guatemalan highlands. Our personal lack of experience with the practice of traditional medicine made us unable to judge the impact of traditional medicine in the face of the emotional and physical injury brought about by the earthquake.

### **Guatemala Está en Pie**

What has happened to the health and nutritional status of Guatemalans since the earthquake? A lasting problem has been the care of persons left paraplegic by earthquake-related injuries. There were more than 50 such men and women at Roosevelt Hospital alone and, for a time, the tremendous amount of requisite nursing care they required threatened to overburden the capacity of the nursing staff. Recently, a rehabilitation facility has been inaugurated with the help of the Governor and the people of Alabama. Another issue was the relocation of patients who had been evacuated from remote areas of the countryside to the capital or to coastal hospitals by ambulance or helicopter. The Agency for International Development funded an emergency appropriation for a project which helped to relocate 500 to 600 patients after their discharge from the hospital.

The anticipated food shortages never developed, and the rate of inflation in food prices has not been accelerated, according to an official of the Economic Information Center of Guatemala. The attendance pattern at the outpatient facilities of the two general hospitals monitored by the Clinical Research Center



of INCAP shows no apparent increase in the incidence of cases of acute protein-calorie malnutrition over previous years.

A major concern was the effects of the tropical rains. Seven major rivers, including the giant Motagua River, had been dammed by landslides, and major flooding in the watershed of the Pacific coastal plain was feared with the advent of the rainy season. Moreover, the rainy season traditionally has the higher rate of diarrheal disease. Neither devastating floods nor major epidemics became a reality, however, in the year following the quake.

The rainy season begins in late May. The primary, initial focus of reconstruction was to provide shelter for the homeless before the rains began. In Guatemala City, the homeless have been concentrated in a sprawling shanty town ironically named *Colonia 4 de Febrero* (The February 4 Neighborhood). These shelters have been constructed of scraps of plastic, wood, tin, and cardboard. In the countryside, the picture is similar, although with the help of continued international relief efforts, substantial homes of wood and cinderblock have been constructed in many rural communities.

## Conclusions and Recommendations

As we stated at the beginning of this report, we attempted neither a systematic nor quantitative description of the health consequences of the Guatemalan earthquake. However, since most public health workers have had no direct experience with a natural catastrophe of the dimensions of the Guatemalan earthquake, we have related our experiences, identifying the health problems we saw and the processes used to solve them. Some situations may have been specific to Guatemala, and a difference in the time of day, season, or location of the seism would, no doubt, have altered the consequences. Some of our experiences, however, may be of general significance. A familiarity with the range of situations that may be encountered in the aftermath of a disaster can help public health workers and planners to address the problems of disaster relief.

A primary maxim is that conditions will vary from minute to minute and from hour to hour. The availability of manpower and supplies as well as the health problems will fluctuate constantly. Relief workers must expect to assess and reassess resources, needs, priorities, and mode of delivering services. The progression from a no-triage, one-treatment-area aid station to a system of triage to several specialized areas including a pharmacy or the movement from a hot meal food service to distribution of com-

modities at the San Juan encampment are examples of the constant flux of circumstances in disasters.

In addition, the standards of medical and surgical care will be dictated by the skill of the available personnel and the extent of the supplies; standards are likely to differ radically from what would be acceptable under normal conditions. Health workers should be aware that indigenous providers of care may have been consulted before patients turn to Western medicine and that traditional medical and dietary beliefs must be respected in order to maintain credibility in the community.

Finally, the presence of relief workers from other areas or countries can be a two-edged sword. Clearly, it was vital for the Guatemalan nation and for individual people to know that they were not alone, that outsiders were coming to the still tremorous countryside and were willing to share the risks. On the other hand, local cultural idiosyncracies, language differences, and unfamiliarity with the terrain limited the effectiveness of foreign relief personnel and even that of urban, Spanish-speaking Guatemalans.

There can be no handbook for the mobilization of response to a disaster. If experience is the best teacher, we hope that our sharing of experiences in the aftermath of the Guatemalan earthquake of February 4, 1976, may help to prepare others who will participate in earthquake relief efforts in the future.

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